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## ON THE VERTICAL RANGE OF BIRDS IN COLO-RADO.

## BY FRANK M. DREW.

Colorado, lying between 37° and 41° north latitude and 102° and 107° west longitude, is preëminently a mountain state. its 104.500 square miles fully one-half is mountainous, the average elevation of the State being 6000 feet, with extremes of 3500 and 14,500 feet. Rising slowly from the Missouri River, the treeless plains, having already reached an altitude of 3500 feet at the eastern border of the State, thence continue to rise more rapidly. but yet gradually, to nearly half way across the State. There, at an elevation of about 6000 feet, the outlying foothills throw up a dam stretching north and south the full length of the State. Up into these foothills surge the waves of bird migration in spring to about Sooo feet — the altitude of the Great Parks which stretch their huge treeless surfaces atop the hills. And down these hills comes the return tide of birds in fall, a few to linger near the base, but by far the greater part passing on and down to an altitude lower than any found within the State.

Despite its latitude, which causes very hot summers, the average temperature is below that of other States in corresponding parallels. At an elevation of about 7000 feet, an approximate average for the year gives a temperature of  $+47^{\circ}$  F.; for winter — December, January, February — of  $+26^{\circ}$ ; spring — March, April, May — of  $+47^{\circ}$ ; summer — June, July, August — of  $+69^{\circ}$ ; autumn — September, October, November,— of  $+46^{\circ}$ . Missouri, in nearly the same latitude, has an approximate mean annual temperature of  $+55^{\circ}$ 

The average temperature on the higher peaks, reaching up to from 12,000 to 14,000 feet, usually ranges from 20° to 30° lower than these figures, the difference being greatest in summer. Continued observations at several stations give an average of about  $+48^{\circ}$  for the mean annual temperature at 6000 feet, and of  $+38^{\circ}$  at 10,000 feet elevation. Timber-line, which varies from 11,000 feet to 12,000 feet, has an average annual temperature - according to Gannet - of  $+30^{\circ}$ . Notwithstanding the heavy and long-continued snows of winter, and the frequent rains in summer,

the mean annual precipitation will not exceed 20 inches,—being 12 to 14 inches on the plains, and increasing to 32 inches in the mountains.

As is well known, the flora of the plains is strongly characterized by buffalo grass, sun flowers, and cacti, and as a natural result, Fringillidæ and Raptores predominate there over all other forms of bird life.

Entering the foothills, which reach an average elevation of 8000 feet, the piñon (*Pinus edulis*) and dwarf oak (*Quercus alba gunnisoni*) at once become abundant, and their matted clumps and tangled underbrush make hiding places for many Warblers. On the shoulders of the foothills rest the mountain parks, with a mean elevation of 8000 feet. They are treeless and plain-like, being covered with grass and sage, save where the grass has been killed out by grazing herds; then the shifting sands prevent aught but sage from maintaining a foothold.

The bases of the main peaks have an elevation of about 8000 feet; thence they rise rapidly, drawing themselves aloof from the life of the plains. And, indeed, it is only those birds which pass up into these uppermost levels which can properly be called mountain inhabitants, the great parks thus forming the real dividing ground between the summer camps of the hardier lowland birds and the homes of those to the manor born. Nor do the straggling migrants but rarely wander over the mountains themselves, but, instead, into these parks.

The latitudinal range of birds in the United States has been quite fully worked out, and notes on the close connection between vertical and geographical distribution are not few; yet, so far as I know, no one has tabulated the vertical range. References to elevations at which birds have been found in summer are quite frequent. Especially is this the case in Allen's 'Ornithological Reconnoissance in Kansas,' etc., and Ridgway's 'Ornithology of the 40th Parallel,' and many are given by Mr. T. M. Trippe in Coues's 'Birds of the Northwest.' I have freely borrowed from these sources, as well as from Henshaw's 'Report' on birds in volume V of Wheeler's Surveys, and from Ridgway's paper on Colorado Birds in 'Bull, Essex Inst.', Vol. V, No. 11.

One working in different parts of the State will soon perceive the floral limits to be quite sharply defined. To a certain, though less extent, the birds also are shut in by almost intangible barriers. But so evident is it that food supply is the main factor in bird distribution—this regulated by vegetation, and this in turn by climatic influences—that it only needs be said that where food is, there the birds will be found: as. e.g., Creepers and Woodpeckers at 11.000 feet in winter, and Ouzels at the same season feeding in the icy torrents as high as 9000 feet.

Most birds range high up in summer and lower in fall; some have a range the reverse of this; while others early reach their nesting-sites and remain until the time for the complete semiannual migration comes round.

Mr. T. M. Trippe, in 'Birds of the North-West.' p. 228, has noted the over-migration in spring of *Oreoscoptes montanns*. This trait is common to many, if not all, birds in vertical migration, though I believe not in latitudinal movements. Another peculiarity of vertical migration is the upward range of many birds during the Indian summer days of autumn, e.g., Sturnella neglecta. Scolecophagus cyanocephalus, Gymnocitta cyanocephala. This I believe to be the result of a scarcity of food at lower levels, though a somewhat similar reverse migration has been noted at the same season on the New England coast. (See B. N. O. C., Oct., 1880, p. 237, and Coues, B. N. W., p. 521.)

The following list, containing the results of five years' work in the State, is believed to be a complete one of the birds found within the boundaries of Colorado. To the south, in New Mexico, climate, and to the north lower average elevation of the mountains, causes considerable variation in the vertical range of birds. But in Colorado, I think, this range is nearly uniform, there being but few birds of the list not of general distribution in the State, and these are chiefly found in the southern portion. Mountain ridges en échelon combine to catch many a straggling bird. Several such are entered on but a single record, and while showing nothing of distribution, yet may be of interest in future work. Some of those accredited on scanty data are followed by the name of the authority. In the parks are found the only apologies for lakes which the State affords, and around them the few Water Birds which remain during the summer cluster to breed. In many of the upper valleys beaver streams often provide suitable homes for isolated pairs of Ducks, but by far the greater number of our Water Birds are migrants.

No claim of completeness is made, the notes being offered as a basis on which to engraft other observations, and which,

with further notes on temperature and the flora, may eventually serve to show to what extent there is a correspondence between vertical and latitudinal distribution. As most of the birds noted are summer visitants, the column showing winter range is mostly blank. The upper nesting limit is usually easily determined; the lower not so readily, as many species, in suitable localities, nest down to sea-level. But in some cases, as in Lagopus leucurus, Regulus calendula, and some others, quite well-defined limits exist, above or below which few, if any, of these birds are found during the nesting season.

Lophortyx californianus, Ortyx virginianus, and perhaps some others, have been introduced in the vicinity of Denver, but probably as yet their range does not extend above 5000 feet.

The figures in the columns under the headings, 'Spring,' Summer,' etc., refer to elevations in feet above sea-level. The 'Breeding Range' will give the full summer distribution of those remaining through that season. In the records of spring and fall migrants I have aimed to show how high the birds wander, and so have merely noted the upper limit of the range of birds which are generally distributed below the altitude given. But in the case of birds of erratic or little-known distribution, both the upper and lower levels inclosing their range are given. A? following the figures in a few cases means probability amounting almost to certainty. The 'Plains' include a large part of adjoining Kansas.

The nomenclature is that of Ridgway's 'Catalogue of the Birds of North America.' But if sub-species 'montana' is merely a modified form of Certhia familiaris rufa, why not put it so, and let it be understood that the last-named form is merely a modification of the preceding, as is now so well accepted in the case of varieties of the first remove? The same applies to Pipilo maculatus arcticus megalonyx.

		Upper Limit of range in- Bre					reds-
		Spring	Summer	Autumn	Winter	from	to
Ι,	Hylocichla fuscescens salicicola		S000			5000	Sooo
2.	Hylocichla ustulata swainsoni	6000		9200		Plains	11000?
3.	Hylocichla unalashkæ auduboni	9500	11500	10000		5000	11500
4.	Merula migratoria propinqua	10000		13000		Plains	11500
5. 6.	Oreoscoptes montanus Mimus polyglottus	6000 6000		9500 5000		66	9500 Sooo
7· 8.	Galeoscoptes carolinensis	9200	Sooo	3000			S000
	Harporhynchus rufus	7500	7500			6.6	7500
9.	H. cinereus bendirei (Brewst.)	0000					
10.	Cinclus mexicanus "Saxicola œnanthe" (Minot)	10000		10000	9-6000	Sooo	10000
12.	Sialia sialis	5500	5500				
1,3.	Sialia mexicana	6000	7500			5000	7500
14.	Sialia arctica	6-10000	11500	13000		5000	11500
15. 16.	Myiadestes townsendi	9500		10-9000		S000	10000
17.	Polioptila cærulca Regulus calendula	7000	7000	10000		5000	7000
18.	Regulus satrapa	6300	11000	10000		7000	11000
19.	Lophophanes inornatus griseus	5000		9200	5000		
20.	Parus montanus	6-9500	11500	13500	5-9000	S000	11500
21.	Parus atricapillus septentrionalis	S000	11000	11000	2-S000	Plains	10000
22. 23.	Psaltriparus plumbeus. Sitta carolinensis aculeata	6000	11000		6500	5000	7000
24.	Sitta canadensis	0000	8,00			5000	S000
25.	Sitta pygmæa		10000			6000	10000
26.	Certhia familiaris rufa montana	Ranges	s to timbe	er line th	e year r	ound	11500
27.	Saipinctes obsoletus	6000	12000 ent at 60	13000		Plains	12000
2Š 29.	Catherpes mexicanus conspersus	7000		10000		Plains	6000
30.	Troglodytes aëdon parkmani Anorthura trog. hyemalis (Ridgw.)	1000	11000	10000		1 mins	10000
31.	Telmatodytes palustris paludicola	6000	Sooo	9500		4.4	8000
32.	Anthus ludovicianus	9500	13000	1.4000		12000	13000
33.	Muiotilta varia	6000	5500	0		#000	
34.	Helminthophaga virginiæ Helminthophaga ruficapilla ( <i>Ridgw</i> .)	6000	7500	8000		5000	7500
35. 36.	Helmintliophaga celata	6000	9000			6000	9000
37.	Helminthophaga peregrina	5500					9
3S.	Parula americana	5500				mi. ·	
39 40.	Dendræca æstiva Dendræca coronata	6000	Sooo			Plains	8000
41.	Dendræca auduboni	9000 7500	11000	9500		7500	11000
42.	Dendrœca maculosa	5000	11000	9300		,,,	
43-	Dendræca cærulea	5000					
44.	Dendræca striata	6000				6000	11000
45. 46.	Dendræca graciæ Dendræca nigrescens	9500	7000 7800			5500	7000
47.	Dendræca townsendi	5000		10000		5500	Sooo
47· 48.	Siurus auricapillus	8000				00	
49.	Siurus nævius Geothlypis macgillivrayi	S000					
50.	Geothlypis macgillivrayi	6000		9500		5000 Plains	9000
51. 52.	Geothlypis trichas Icteria virens longicauda	6000 6000				1-121115	6500
53-	Wilsonia pusilla	9500		11000		6000	12000
54.	Setophaga ruticilla	6000				Plains	Sooo
55.	Vireosylvia gilva swainsoni	6000		. 7000		5000	10000
56.	Lanivireo solitarius plumbeus	6000		7500		5000	9000
57· 58.	Lanius borealis Lanius ludovicianus excubitoroides	6-10000 9500		12500	*-9500	Plains	9500?
59.	Ampelis garrulus	9500		9500	Sooo	. 141113	95001
60.	Ampelis garrulus Ampelis cedrorum		9000		5500		9000
61.	Petrochelidon lunifrons	6000	11000	9500	33 -	66	10000
62.	Hirundo erythrogaster	7000 S000	11000			66	10000
63. 64.	Tachycineta bicolor Tachycineta thalassina			0,500		5000	10000
65.	Cotile riparia	7000	6000	9500		Plains	10500
66.	Stelgidopteryx serripennis	6000				11	
67.	Progne subis	1	8000			6000	7000 8000
6S. 69.	Pyranga ludoviciana	6000	9000	10000		6000	9000
	Pyranga æstiva cooperi Hesperiphona vespertina	5000 5000	Sooo				
70. 71.	Pinicola enucleator	10000		10000	*-10000	10000	11500
-			5.7				

<sup>\*</sup> Plains.

114. Zamelodia melanocephala   6000   8000   8000   115. Guiraca carulea   5500   115. Guiraca carulea   5500   116. Passerina cyanea (Ridgway)   117. Passerina amœna   6000   7000   7000   118. Cardinalis virginianus   6000   8000   8000   120. Calamospiza bicolor   6-9200   8000   8000   121. Dolichonyx oryzivorus   6000   8000   122. Molothrus ater   6000   8000   8000   123. Xanthocephalus icterocephalus   6000   9500   9500   124. Agelæus phaéniceus   6000   9000   7000   125. Sturnella neglecta   6000   9200   10000   10		Upper Limit of range in— Breeds—						ds —
1.   Carpodacus frontalis			Spring	Summer	Autumn	Winter	from	to
Loxia curvirostra americana   6000   S000   Plains   5000   S000   S00	72.	Carpodacus cassini	6000		9000			
	73· 74·	Loxia curvirostra americana	. 6000			Plains		
77. Leucosticte tepintocotis intorains 78. Leucosticte australia 79. Leucosticte australia 70. Leucosticte australia 71. Composition of the property of th	70.	Leucosticte tephrocotis				6000		
1000   13500	77. 78.	Leucosticte atrata				5000		•
81. Astragalinus tristis 82. Astragalinus pasaltria 83. Chrysomitris pinus 84. Piectrophanes nivalis (Ridgway) 85. Centrophanes naccowni 86. Centrophanes maccowni 87. Rhyncophanes maccowni 88. Centrophanes maccowni 89. Passerculus sandwichensis alaudinus 91. Poccetes gramineus confinis 92. Coturuiculus passernus perpallidus 93. Chondestes gramineus confinis 94. Z notrichia leucophrys 95. Z notrichia gambeli intermedia 96. Spizella montana 97. Spizella domestica arizonæ 97. Spizella montana 98. Spizella pallida 99. Spizella pallida 99. Spizella pallida 99. Spizella pallida 99. Spizella pallida 90. Junco aikeni 101. Junco aikeni 102. Junco oregonus 103. Junco amectens 104. Junco oregonus 105. Amphispiza belli nevadensis 106. Amphispiza belli nevadensis 107. Melospiza lincolni 108. Piplio duclutus arcticus megalonyx 119. Piplio fuscus mesoleucus 113. Piplio fuscus mesoleucus 113. Piplio fuscus mesoleucus 114. Ziuneldia melanocephala 115. Gairaca cerulea 116. Passerina cyanea (Ridgway) 117. Passerina anema 119. Spiza americana 119. Calamospiza bicolor 121. Teterus gulius 122. Corvus cyptoleucus 123. Teterus purius 124. Ageleus pharniceus 125. Icterus spurius 126. Corvus cyptoleucus 127. Crovus cyptoleucus 128. Pipriorens canadensis canitalis 129. Perisorens canadensis canitalis 130. Pierisorens canadensis canitalis 131. Pipriorens canadensis canitalis 132. Pipriorens canadensis canitalis 133. Aphelocoma woodbousei 134. Pierisorens canadensis canitalis 147. Crovus cyptoleucus 136. Aphelocoma woodbousei 137. Cyanocitat stelleri macrolopha 138. Aphelocoma woodbousei 139. Previsorens canadensis canitalis 148. Aphelocoma woodbousei 149. Previsorens canadensis canitalis 149. Previsorens canaden	79. So.	Leucosticte australis Ægiothus linaria	7-10000					
\$\frac{8}{2}\$. Chrysomitris pinus \frac{8}{2}\$. Pectrophanes nivalis (\( Ridgway \) \\ 85. Centrophanes lapponicus \\ 85. Centrophanes maccowni \\ 86. Passerculus sandwichensis savanna \\ 87. Rhyncophanes maccowni \\ 89. Passerculus sandwichensis savanna \\ 90. Passerculus sandwichensis alaudinus \\ 91. Condestes grammicus strigatus \\ 92. Contrichia gambeli intermedia \\ 93. Tontrichia gambeli intermedia \\ 95. Spizella momestica arizonæ \\ 95. Spizella momestica arizonæ \\ 95. Spizella pallida \\ 95. Spizella pizella \\ 95. Spizella preweri \\ 95. Amphispiza belli (\( Ridgway \) \\ 100. Amphispiza belli (\( Ridgway \) \\ 101. Piplo maculatus arcticus megalonyx \\ 111. Piplo chlorurus \\ 112. Piplo falscus mesoleucus \\ 113. Piplo falscus meman \\ 124. Agelæus phachiceus \\ 124. Agelæus phachiceus \\ 125. Sturella necana \\ 126. Cartinalis virginianus \\ 127. Icterus galbula \\ 128. Torvus coryus columbianus \\ 129. Corvus cryptoleucus \\ 121. Porvus corvus columbianus \\ 122. Corvus cryptoleucus \\ 123. Aphelocoma woodhousci \\ 124. Preiorens canadensis cannialis \\ 125. Surnocita at elleri mezotophal \\ 126. Preiorens canadensis cannials \\ 127. Corvus cryptoleucus \\ 128. Aphelocoma woodhousci \\ 129. Preiorens canadensis cannials \\ 120. Preiorens canadensis cannials \\ 121. Porvus corvus columbianus \\ 122. Aphelocoma woodhousci \\ 123. Aphelocoma woodhousci \\ 124. Aphelocoma woodhousci \\ 125. Corvus cryptoleucus \\ 126. Preiorens canadensis cannialis \\ 127. Corvus cryptoleucus \\ 128. Aphelocoma woodhousci \\ 129. Preiorens canadensis cannialis \\ 120. Preiorens canadensis cannialis \\ 120. Preiorens canadensis cannialis \\ 120. Preiorens canad	81.	Astragalinus tristis	5000 5000	9500				
\$5. Centrophanes happonicus \$6. Centrophanes maccowni \$7. Rhyncophanes maccowni \$8. Centrophanes maccowni \$8. Centrophanes maccowni \$8. Centrophanes maccowni \$8. Centronyx bairdi \$9. Passerculus sandwichensis savanna \$9. Passerculus sandwichensis savanna \$9. Passerculus sandwichensis alaudinus \$9. Coturniculus passernus perpullidus \$9. Chondestes grammicus strigatus \$9. Z. Austrichia leucophrys \$9. Z. Jontrichia gambeli intermedia \$9. Spizella mestica arizonæ \$9. Spizella mestica arizonæ \$9. Spizella mestica arizonæ \$9. Spizella pallida \$9. Spizella pallida \$9. Spizella perpullidus \$9. Spi	83.	Chrysomitris pinus	6-10000	11500	10000	*-10000	7000	11500
Schemony	85.	Centrophanes lapponicus	<b>£000</b>		7500	5000		
Sop.   Passerculus sandwichensis salvadinus   Sop.   Passerculus sandwichensis salvadinus   Sop.   Passerculus sandwichensis salvadinus   Sop.   Passerculus sandwichensis salvadinus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Passerculus   Sop.   Sop.   Passerculus   Sop.   Sop.   Passerculus   Sop.   Sop.   Passerculus   Passerculus   Sop.   Sop.   Passerculus   Sop.   Sop.   Passerculus   Sop.   Sop.   Sop.   Passerculus   Sop.	S7.	Rhyncophanes maccowni	6000	8000	7000	5000	Pl'ne?	
92. Coturniculus passerinus perpallidus 93. Chondestes grammicus strigatus 94. Z motrichia leucophrys 95. Z motrichia grambeli intermedia 96. Spizella montana 97. Spizella domestica arizona 98. Spizella pallida 99. Spiz	S9.	Passerculus sandwichensis savanna	5000	5000	7000			
93. Chondestes grammicus strigatus	91.	Poœcetes gramineus confinis		12000	12500		6.6	12000
95. Z motrichia lencophrys 95. Z motrichia gambeli intermedia 95. Spizella montana 97. Spizella montana 98. Spizella pallida 99. Spizella pallida 99. Spizella breweri 100. Junco aikeni 101. Junco necanicalis 102. Junco orgonus 103. Junco annectens 104. Junco contectus 105. Amphispiza belli (Ridgway) 105. Amphispiza belli (Ridgway) 106. Amphispiza belli nevadensis 107. Melospiza lincolni 109. Passerila lilica schistacea (Ridg.) 1109. Pipilo dalorurus 111. Pipilo chlorurus 112. Pipilo fascus mesoleucus 113. Pipilo aberti 114. Zanelodia melanocephala 116. Cardinalis vitginianus 119. Spiza americana 120. Calamospiza bicolor 121. Dolichonyx oryzivorus 122. Molothrus ater 123. Xanthocephalus icterocephalus 126. Carvus cynocyclecus 127. Icterus spurius 128. Icterus spurius 129. Scolecophagus cyanocephala 130. Corvus crytoleucus 131. Corvus crax carnivorus 132. Corvus crax carnivorus 133. Corvus crax carnivorus 134. Picicorvus columbianus 135. Gymnocitat cyanocephala 136. Corvus crytoleucus 137. Cyanocitus stelleri macrolopha 138. Aphelocoma woodhousei 139. Picrisoreus canadensis capitalis 130. Picrisoreus canadensia 131. Picrisoreus canadensia 132. Corvus crytoleucus 133. Aphelocoma woodhousei 134. Aphelocoma woodhousei 135. Gymnocitat cyanocephala 136. Orresponse canadensis capitalis 137. Cyanocitus stelleri macrolopha 139. Operative control macrolopha 130. Operative control macrolopha 131. Operative control macrolopha 132. Corvus cytoleucus 133. Aphelocoma woodhousei 134. Aphelocoma woodhousei 135. Gymnocitat cyanocephala 136. Operative control macrolopha 137. Cyanocitus stelleri macrolopha 139. Operative control macrolopha 130. Operative control macrolopha 131. Operative control macrolopha 132. Operative control macrolopha 133. Aphelocoma woodhousei 134. Corvus cytoleucus 135. Operative control macrolopha 137. Cyanocitus stelleri macrolopha 138. Operative control macrolopha 139. Operative control macrolopha 130. Operative control macrolopha 131. Operative control macrolopha 132. Operative control macrolopha 133. Op		Chondestes grammicus strigatus .		10000			66	10000
65. Spizella montana         9500         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         9000         8000         9000         9000         8000         9000         8000         9000         8000         9000         8000         8000         9000         8000         8000         9000         8000         8000         9000         8000         8000         9000         8000         8000         8000         9000         8000         9000         8000         8000         9000         8000         9000         8000         9000         8000         9000         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         7500         12000         6500         11500         9000		Z motrichia lencophrys		12500	10000	6000?	8000	12500
99. Spizella pallida 99. Spizella breweri 100. Junco akeni 101. Junco hiemalis 102. Junco annectens 103. Junco annectens 104. Junco canticeps 105. Amphispiza belli (Ridgway) 106. Amphispiza belli (Ridgway) 107. Melospiza liacciata fallax 108. Melospiza liacciata fallax 109. Passerella iliaca schistacea (Ridg.) 110. Pipilo maculatus arcticus megalonyx 111. Pipilo chlorurus 112. Pipilo aberti 114. Zamelodia melanocephala 115. Guiraca carulea 116. Passerina qyanea (Ridgway) 117. Passerina amema 119. Spiza americana 120. Calamospiza bicolor 121. Dolichonyx oryzivorus 122. Molothrus ater 123. Xanthocephalus icterocephalus 124. Agelæus phæniceus 125. Sturnella neglecta 126. Icterus spurius 127. Icterus spurius 128. Icterus bullocki 129. Scolecophagus cyanocephala 130. Quiscalus purpureus æneus 131. Corvus corax carnivorus 132. Corvus cryptoleucus 133. Corvus frugivorus 134. Picicorvus columbianus 135. Gymnocitta cyanocephala 136. Cyanocitta stelleri macrolopha 137. Cyanocitta stelleri macrolopha 138. Aphelocoma woodhousei 139. Pica rustica hudsonica 130. Capacita stelleri macrolopha 131. Chaptica canadensis capitalis 132. Corvus columbianus 133. Aphelocoma woodhousei 134. Aphelocoma woodhousei 135. Aphelocoma woodhousei 136. Carvus canadensis capitalis 137. Cyanocitta stelleri macrolopha 138. Aphelocoma woodhousei 139. Capacita stelleri macrolopha 130. Capacita stelleri macrolopha 131. Capacita stelleri macrolopha 132. Capacita stelleri macrolopha 135. Capacita stelleri macrolopha 136. Capacita stelleri macrolopha 137. Cyanocitta stelleri macrolopha 138. Aphelocoma woodhousei	95.	Spizella montana		9000	9000	9000	5000	0000
100.   Junco akeni   S-10000   S-2000		Spizella pallida	6000	6000			Plains	6000
103	100.	Junco arkeni	5-10000		9000			
105	102.	Junco oregonus	6000			*-6000		
105. Amphispiza belli nevadensis   107. Melospiza fiasciata fallax   6000   5000   5000   5000   5000   1150	104.	Tunco caniceps					7500	
105		Amphispiza belli nevadensis						7000
100		Melospiza fasciata fallax Melospiza lincolni		11500	9000	5000		11500
111. Pipilo chlorurus		Passerella iliaca schistacea (Ridg.)		7000	Sooo	5000	5000	
113. Pipilo aberti		Pipilo chlorurus			9000			11500
115.   Guiraca cærulea	113.	Pipilo aberti	6000		Sooo	3022	Plains	Sooo?
117.   Passerina amæna   6000   7000   7000   6000   11500	115.	Guiraca cærulea	0000					
119. Spiza americana   6000   6000   6000   6000   120. Calamospiza bicolor   6000   8000   8000   6000   121. Dolichonyx oryzivorus   6000   8000   8000   122. Molothrus ater   6000   8000   8000   123. Xanthocephalus icterocephalus   6000   9500   7000   124. Agelæus phafniceus   6000   9000   7000   125. Icterus spurius   6000   2000   10000   127. Icterus galbula   6000   10000   128. Icterus bullocki   6000   10000   129. Scolecophagus cyanocephalus   6000   10000   13000   4-9000   10000   131. Corvus corax carnivorus   13000   131. Corvus corax carnivorus   13000   1	117.	Passerina amœna	6000	7000	7000	#000	6.6	7000
121. Dolichonyx oryzivorus   6000   122. Molothrus ater   6000   8000   123. Xanthocephalus icterocephalus   6000   9000   7000   124. Agelæus phaéniceus   6000   9000   7000   125. Sturnella neglecta   6000   9200   10000   125. Icterus galbula   5000   126. Icterus galbula   6000   10000   13000	119.	Spiza americana	1	1 0	0000	5000		
122. Africantus after   123. Xanthocephalus   124. Agelæus pha'niceus   125. Strinella neglecta   125. Strinella neglecta   125. Icterus spurius   125. Icterus spurius   126. Icterus spurius   127. Icterus galbula   128. Icterus bullocki   129. Icterus bullocki   13000   1300	121.	Dolichonyx oryzivorus	6000		3000			
124. Agelæus phachiceus   6000   9000   7000   11500   13000   14000   15000   13000	123.	Xanthocephalus icterocephalus	6000	9500	9500		44	7500
127. Icterus spurius   5000   6000   127. Icterus galbula   5000   10000   128. Icterus bullocki   6000   10000   13000   4-9000   Plains   10000   13000   13000   4-9000   Plains   10000   13000   14-9000   Plains   10000   14-9000   Plains   10000   14-9000   Plains   10000   14-9000   Plains   10000   14-9000   Plains   100000   14-9000   Plains   100000   100000   100000   100000   100000   100000   100000   100000   100000   100000   100000   10000   100000000	124.	Agelæus phæniceus		9000	7000		6.6	S000 S000
128   Icterus bullocki   6000   10000   13000   4-9000   130	125.	Icterus galbula		5000			"	6000?
130. Quiscalus purpureus geneus   5000   131. Corvus corax carnivorus   13000   14000   5-10000   132. Corvus cryptoleucus   6000   7000   7000   134. Picicorvus columbianus   9000   11500   13000   7-9000   6500? 11500   135. Gymnocitta cyanocephala   5000   8000   6-13500   6000   5000   8000   135. Pica rustica hudsonica   9000   11500   13000   5-10000   5000   137. Cyanocitta stelleri macrolopha   6-10000   11500   3-9000   5000   1350   1	128.	Icterus bullocki		10000	13000	4-0000	5000 Plains	
132.         Corvus cyptoleucus         6000         7000         4000         6000         7000         7000         7000         7000         7000         7000         7000         7000         7000         7000         7000         7000         115	130.	Quiscalus purpureus æneus	5500	5000				
134. Picicorvus columbianus   9000   11500   13000   7-9000   5000   11500   13000   7-9000   5000   13000   7-9000   5000   13000   7-9000   5000   13000   7-9000   5000   13000   7-9000   5000   5000   5000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   13000   7-9000   5000   5000   5000   5000   13000   7-9000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   5000   5000   13000   7-9000   5000   13000   7-9000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   5000   13000   7-9000   5000   5000   5000   13000   7-9000   5000   5000   5000   5000   13000   7-9000   5	132.	Corvus cyptoleucus		6000				
135. Pica rustica hudsonical   9000   11000   10000   3-9000   4000   10000   137. Cyanocitta stelleri macrolopha   6-10000   1500   1500   15000	134.	Picicorvus columbianus		11500	13000			11500
13S. Aphelocoma woodhousei 5000 8000 9500 5000 8000	136.	Pica rustica hudsonica	9000	00011	10000	3-9000	4000	10000
tro Perisoreus canadensis capitalis   †   †   †   †   \$000   11500	137. 138.	Aphelocoma woodhousei	5000			5000	5000	8000
	139.	Perisoreus canadensis capitalis	1	1 1	1 1	†	Sooo	

<sup>\*</sup> Plains.

<sup>13000 | 5-9000</sup> † Keeps near timber-line the year round.

Upper Limit of range in - Breeds-

141.   Eremophila alpestris chrysolema   142.   Tyrannus carolinensis   7500   6000   7000				• •				
123			Spring	Summer	Autumn	Winter	from	to
123	141.	Eremonhila alnestris chrysolama		7000			Plains	7000
1431   Tyrannus verticalis   6000   7000   4		Tyrannus carolinensis	7500				66	
145		Tyrannus verticalis	6000					7000
145		Tyrannus vociferans	6000					
147. Contopus brealis   6000   12000		Mylarchus cinerascens	6	7000				7000
14 5. Cemtopus richardsoni   6000   1000   10000   1		Contonue barealis			10000			
190. Empidonax dilificilis   0000   10000   5000	147.	Contonns richardsoni					Plains	
150. Empidonax pusillus   5000   50	140.	Empidonax difficilis						
151. Empidonax minimus		Empidonax pusillus		S000			66	Sooo
153. Empidonax hammondi   6000   1500   7500   10500   10500   155. Selasphorus platycercus   5000   15000   6000   155. Selasphorus platycercus   5000   15000   6000   155. Selasphorus platycercus   5000   15000		Empidonax minimus	6000					
154	152.	Empidonax hammondi	6000	8000	1			
155. Selasphorus platycercus   500   13000   9000   4000   10500   10500   10500   10500   12500   1			6000		1		7500	
150. Selasphorus rufus   150. Selasphorus rufus rufus   150. Selasphorus rufus r					İ			
155. Cypseloides miger borealis   14000   14000   14000   1500	155.		5000		9000			
190. Phalamoptila nuttalli	150.	Cyncolne cavatilic	6000					
190. Phalamoptila nuttalli	158.	Cynseloides niger horealis	0000		11000			
160. Chordeiles popetue henryi	150.	Phalænoptila nuttalli	6000	S000	14000		Plains	
161.   Picus villosus harrisi   6-10000   12000   10000   5-10000   4500   11500   11500   12000   12000   10000   5-10000   4500   11500   12000	160.	Chordeiles popetue henryi			9500		66	110005
162. Picus pubescens gairdneri   6-10000   12000   10000   5-10000   5000   12000	161.	Picus villosus harrisi				5-10000	4500	
164.   Sphyrapicus varius (Ridgway)   165.   Sphyrapicus varius nuchalis   Soo   12000   5000   1200		Picus pubescens gairdneri	6-10000	12000		5-10000	4500	
165.   Sphyrapicus varius nuchalis   Sooo   12000   5500   7000   12000     165.   Melanerpes crythrocephalus   6000   11000   5000   7000   5000     165.   Melanerpes crythrocephalus   6000   12000   5000   7000   5000     166.   Melanerpes crythrocephalus   6000   12000   5000   7000   5000     167.   Certyle alcyon   6000   12000   5000   5000   5000     171.   Certyle alcyon   7000   7000   7000   7000   7000     172.   Geococcyx californiainus   7000   7000   7000   7000   7000   7000     173.   Coccyzus americanus   7000   7000   7000   7000   7000   7000   7000   7000     175.   Asio americanus   7000			10000	1 2000	10000	10000	8000	12000
160.   Sphyrapicus thyroideus   60.   10000   7000   5000   10000	164.	Sphyrapicus varius (Ridgway)	0				4000	*****
165.   Melanerpes erythrocephalus   6000   11000   5000   7000   4-7000   5000   700	105.	Sphyrapicus varius nuchans						
105.   Melanerpes cryturocephalus   600.   1000.   5000.   7000.   4-7000.   5000.   5000.   7000.	167	Centurus carolinus (Ridgenay)	0000	10000	7000		3000	10000
169.   Melanerpes torquatus   6000   3000   7000   4-7000   5000   12000   12000   3-5000   12000   12000   12000   3-5000   12000	168.		6000	11000	5000		Plains	10000
170						4-7000		
171.   Ceryle alcyon						3-5000	Plains	
173.   Coccyus anifornianus						0.0	6.6	9500
173.   Coccyzus americanus		Geococcyx californiainus	1	5000		5000		
175	173.	Coccyzus americanus					4000	8000
176							Dlaina	
175. Scops flammeolus	175.		0000					
175	170.	Scope dammoolne			5000	5000	4000	
179.   Spectyto cunicularia hypogaa   1	178		11000		13000	*-11000	4000	
150.   Hierofalco mexicanus polyàgrus   6000   10000	170.			t			Plains	
181.   Falco peregrinus nævius   10000   182.   Æsalon rcihardsoni   10000   1500   13000   13000   13000   13500   13000   13500   10500   13500   10500	18o.	Hierofalco mexicanus polyagrus		10000			66	
182.	181.	Falco peregrinus nævius		10000				10000
13.	182.							
134.   11   11   1300   1500	183.				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1		******
187. Accipiter cooperi   6000   9000   13500   "   9000   9000   188. Accipiter fuscus   9500   90000   9000   9000   9000   9000   9000   9000   9000   9000   90000	184.		0-10000					
187.   Accipiter cooperi   6000   9000   9000   188.   Accipiter fuscus   9500   9500   9000   189.   Accipiter fuscus   9500   10000   13500   10000   1200	135.		6000				66	
1800	180.	Acciniter cooperi			13300		66	
1800	188.	Accipiter fuscus			{		44	
1900   13500   10000   13000   11500   12000   13500   11500   11500   12000   13000   11500   12000	1Sq.		9500			9500		10000
191. Buteo cooperi (Ridgraay)   192. Buteo swainsoni   193. Archibuteo lagopus sancti-johannis   194. Archibuteo ferrugineus   195. Cathartes aura   197. Cathartes aura   198. Columba fasciata   199. Columba fascia		Buteo borealis calurus	11000	12000	13500	*-10000	66	12000
193. Archibuteo lagopus sancti-johannis   194. Archibuteo lagopus sancti-johannis   194. Archibuteo ferrugineus   6000   14000   6000   1250	191.	Buteo cooperi (Ridgway)					.,	
194. Archibuteo ferrugineus   6000   14000   14000   8-11000   12500     195. Aquila chrysaëtus canadensis   6-10000   12000   14000   8-11000   12500     197. Cathartes aura   6000   11000   10000   10000     198. Columba fasciata   7000   8000   8000   10000     199. Zenaidura carolinensis   6000   11000   12000   11000     200. Melopelia leucoptera   11500   11500   12000     201. Meleagris gallopavo americana   10000   11500   12000   7000     202. Canace obscura   10000   11500   12000   11500     203. Bonasa umbella umbelloides   7000   7000   7000     204. Lagopus leucurus   12000   13500   5000   8-12000   13500     205. Cupidonia cupido   5000   5000   8-7000   13500     206. Pediecetes phasianellus columbianus   7000   7000   8-7000   8-7000   13500     207. Centrocercus urophasianus   9500   8-7000   8-7000   10000     208. Ardea herodias   7000   7000   8-7000   8-7000   10000     208. Ardea herodias   7000   7000   8-7000   8-7000   9500     208. Ardea herodias   7000   7000   7000   8-7000     208. Ardea herodias   7000   7000   8-7000   8-7000     2090   7000   7000   8-7000   8-7000     2091   2001   2002   2002   2002     2002   2003   2003   2003   2003     2003   2004   2004   2004   2004     2004   2005   2004   2004   2004     2005   2006   2006   2004   2004     2006   2006   2006   2006   2006     2007   2008   2008   2008   2008     2008   2008   2008   2008   2008     2008   2008   2008   2008   2008     2008   2008   2008   2008   2008     2009   2009   2008   2008     2009   2009   2008   2008     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009   2009   2009     2009   2009	192.	Buteo swainsoni	6-10000	10000	13000	1		11500
195								******
197.   Cathartes aura   6000   10000   11000   Plains   5000   10000					14000		6000	
195. Columba fasciata   7000   5000	195.				14000	"-11000	0000	12300
198. Columba fasciata	107				11000		Plains	
199. Zenaidura carolinensis   6000   11000   12000   Plains   100000   100000   100000   100000   100000   100000   100000	10\$.							Sooo
200.         Melopelia lencoptera         11500         7000         17000         17000         11500         7000         11500         7000         11500         7000         11500         7000         11500         7000         11500         7000         11500         7000         11500         7000         7000         7000         7000         7000         7000         7000         7000         7000         7000         7000         7000         8-12000         11500         13500         900         8-12000         11500         12500         7000         7000         7000         7000         7000         7000         7000         8-12000         11500         12500         7000         7000         7000         7000         7000         7000         8-12000         11500         12500         7000         7000         8-12000         11500         12500         12500         7000         7000         8-12000         11500         12500         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8-12000         8	199.						Plains	
201. Meleagris gallopavo americana   10000   11500   12500   7-10000   6000   11500   7000   12500   7-10000   7000   12500   7-10000   7000								
202. Canace obscura		Meleagris gallopavo americana		7000				
204. Lagopus leucurus 12000 13500 2005. Cupidonia cupido 5000 5000 5000 8-12000 Plains 5000 7000 7000 8-7000 9500 5000 8-7000 9500 9500 9500 9500 9500 9500 9500		Canace obscura	10000		12500	7-10000	6000	
205. Cupidonia cupido 5000 5000 8 Pláins 5000 7000 7000 7000 8 2700 7000 7000 7000						0		
200. Pediæcetes phasianellus columbianus 7000 7000 7000 *-7000 " 7000 9500 0500 " -7000 9500 0500 " -7000 9500 0500 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 05000 " -7000 9500 0500 0500 0500 0500 0500 0500						3-12000		
207. Centrocercus urophasianus 9500		Padimentes phasianellus columbianus	5000	7000	7000	*-7000		7000
20S. Ardea herodias 5000 5000		Centrocercus urophasianus	7000		1 7000			9500
209. Garzetta candidissima § § §		Ardea herodias		5000				5000
			§	§	l §	Ş		

<sup>\*</sup> Plains.

1885.]

<sup>‡</sup> Resident and breeds up to 9000 feet.

<sup>†</sup> See B. N. O. C., Vol. II, No. 2, p. 50.

<sup>§</sup> See American Naturalist, Vol. X, p. 430.

		Upper limit of range in- Breeds-					eeds—
		Spring	Summer	Autumn	Winter	from	to
210.	Nyetherodius violaceus (Ridgway)						
211.	Botaurus lentiginosus Tantalus loculator (Ridgway)	5000	7000			Plains	7000
212.	Plegadis guarauna		7000				7000?
214.	Charadrius dominicus (Ridgway)		10500			66	
215.	Oxyechus vociferus Podasocys montana	9000	S000	5000		c t	S000
217. 218.	Gallinago media wilsoni	10000	10000		5000	6000	10000
21S. 219.	Macroramphus griseus Actodromas maculata	6000	5000	10500			5000?
220.	Actrodomas bairdi		7000	13000			7000?
221.	Actrodomas minutella		7000				7000?
223. 223.	Pelidna alpina americana (Ridgway) Ereunetes pusillus	7000		7000			7000?
224.	Limosa fedoa			7500		Plains	
225. 220.	Totanus melanoleucus Totanus flavipes		7000				7000?
227.	Rhyacophilus solitarius	6000	10000		-	5000	10000
228.	Symphemia semipalmata	6000	7000			Plains	7000 6000
229.	Bartramia longicauda Tringoides macularius	6000	13000	9000		,,	11000
231.	Numenius longirostris		5000	)		91	5000
232.	Lobipes hyperboreus Steganopus wilsoni (Ridgway)	9500	S000 6000		5000		6000
233. 234.	Recurvirostra americana	5000	Sooo			66	S000
235.	Himantopus mexicanus	5000	Soco			66	S000
230.	Rallus virginianus Porzana carolina (Ridgway)		5000 7000				5000?
237. 238.	Gallinula galeata (Allen & Brewster)	6000					
239.	Fulica americana		S000			66	S000
240.	Grus americana (Ridgway) Grus canadensis		7500	14000		5000	7500
242.	Chen hyperboreus			Šooo	7500		
243.	Bernicla canadensis Bernicla canadensis hutchinsi	10000	10000		5000		10000
244.	Anas boschas	6000		10500	*-9500	5000	9000
246.	Anas obscura (Ridgway)		8200	10000		Plains	S000
247. 248.	Chaulelasmus streperus Dafila acuta		6000	10000	5000		6000
249.	Mareca americana		Soou	Sooo		"	8000
250.	Spatula clypeata Querquedula discors	10000	S000 S000.	10000		66	S000 S000
251. 252.	Querquedula cyanoptera	6000	Souo	10000		5000	S000
253.	Nettion carolinensis	10000	S000	10000		Plains	S000 S000
254· 255·	Aix sponsa Fulix marita		Soou	9000			8000
256.	Fulix affinis			9000			
257. 258.	Fulix collaris			6000	5000		
259.	Æthya vallisneria Æthya americana (Ridgway)				3000		
250.	Clangula islandica		S000				Sooo
261. 252.	Clangula glaucium americana Clangula albeola			9000 6000			
263.	Histrionicus minutus		10000	10000		7000	10000
254.	Œdemia americana (Ridgway)	1 8					
255. 255.	Erismatura rubida Mergus merganser americanus		10000	11000		7000	10000
257. 258.	Lophodytes cucullatus (Ridgway)	- 1					
	Pelecanus erythrorhynchus (Ridg.) Larus delawarensis	6000	4000 6000	0500			4700 6000
259. 270.	Xema sabinei (Ridgway)	3000	3000	9500			0000
271.	Xema sabinei (Ridgway) Sterna forsteri (Aiken)	6000	-				6000
272.	Hydrochelidon lari, surinamensis Stercorarius parasiticus ( <i>Ridgway</i> )				5000		
273. 274.	Podiceps holboelli		7	10000		11	
274. 275.	Dytes auritus californicus	7000	S000			1	S000
276. 277.	Podilymbus podiceps (Ridgway) Colymbus torquatus (Ridgway)						
			1				